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Four New Terrestrial Isopod Crustaceans from Kashima Islet and its neighboring, Tanabe Bay*

Noboru Nunomura

Toyama Science Museum

1-8-31, Nishinakano-machi, Toyama, 939-8084, JAPAN

南紀神島ならびにその周辺の陸産等脚目甲殻類の4新種

布村 昇

富山市科学文化センター

〒939-8084富山市西中野町1-8-31

和歌山県田辺湾の神島は原生的自然としての照葉樹林が保存された天然記念物であり、南紀の原生的自然を解明するため重要な場所であるため、この島のワラジムシ相を調査した。比較のため、付近にある畠島と京都大学瀬戸臨海実験所構内を調査した。特に畠島は自然保護のため、京都大学瀬戸臨海実験所の管理下に置かれ、許可無しに上陸できない場所である。本調査で *Quelpartoniscus setoensis* (和名: セトウミベワラジムシ(新称)), *Burmoniscus tanabensis* (和名: タナベモリワラジムシ(新称)), *Lucasioides minakatai* (和名: ミナカタハヤシワラジムシ(新称)), *Venezilllo longispinus* (和名: ケナガコシビロダンゴムシ(新称)) の4種を新種として記載した。

キーワード: 陸産等脚目, 神島, 新種, ウミベワラジムシ科, ヒメワラジムシ科, トウヨウワラジムシ科, コシビロダンゴムシ科

Key words: Terrestrial Isopoda, Kashima, new species, *Quelpartoniscus*, *Burmoniscus*, *Lucasioides*, *Venezilllo*

Kashima Islets are located in Tanabe Bay. The position of the island is 33°42'N, 135°22'50"E (Fig. 1). Kashima (Fig. 1) consist of 2 main islets; Oyama and Koyama. Both are lower than 20m even at the highest posits and (Morikawa, 1957), less than 400m from the nearest mainland.

The dominant trees of the vegetation are *Ilex integra*, *Rhus silvestris*, *Camellia japonica*, *Machilus thunbergii*, *Daphniphyllum tejssmannii*, *Cinnampom japoniovcius*, *Prunus zippeliana* (Goto and Tamai, 1988 ; Goto and Tamai, 2001).

To compare with the isopod fauna of Kashima, I examined the isopods of Hatakejima, the experimental field of Seto Marine Biological Laboratory, which is situated in the southeast part of Tanabe Bay, about 1.0 km from Kashima and 0.6 km form the nearest mainland the vegetation of this islet is reduced due to the human activities.

I also examiend those of Seto Marine Biological Laboratory, which is located at the mainland of Kii Peninsula and include laurel forests and artificial vegetation such as lawn field and quick hedge.

Acknowledgement

I would like to express my sincere gratitude to late Mr. Shin Goto and Mr. Sumio Tamai, for their kindness in

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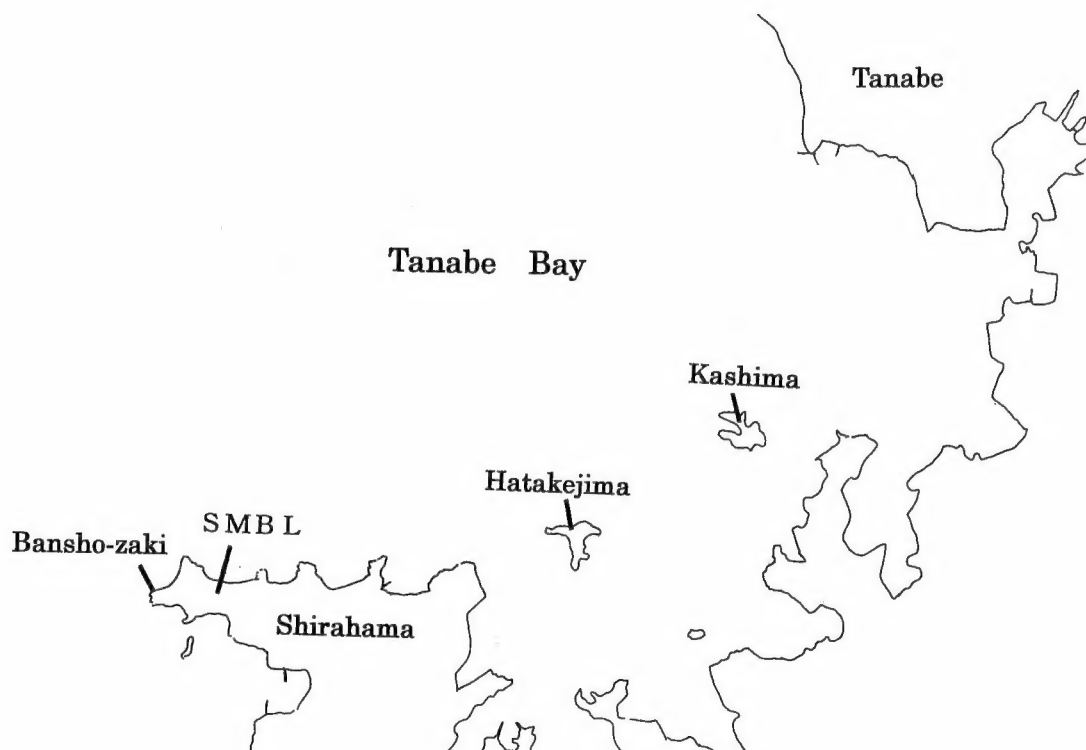


Fig. 1 Map showing the areas studied.

survey of Islet Kashima, Dr. Shin Kubota, Mr. Yoshikazu Yamamoto and many staffs of the Seto Marine Biological Laboratory for their kindness in collecting. Without the permission of Tanabe City, the survey would be far from possible; because Kashima Islet is strictly preserved area.

Family Scyphcidae

Quelpartoniscus setoensis n.sp.

(Fig. 2)

Description: Body 2.5 times as long as wide. Color white. Surface with many small tubercles. Cephalon rounded; anterior margin straight, posterior margin rounded. Eyes small, each eyes with 12-13 ommatidia. Pleon not abruptly narrower than pereon. Pleotelson triangular, its tip pointed.

Antennule (Fig. 2B) 3-segmented; segments 1 and 2 subequal in length, segment 3 with 3-4 aesthetascs at the tip. Antenna (Fig. 2C) reaches the pereonal somite 2. Mutual length of 5 peduncular segment is 2:4:4:9:11. Flagellum 3/4 as long as 5th peduncular segment and mutual length of 3 flagellar segments is 4:3:4.

Right mandible (Fig. 2D) : pars incisiva 3-toothed; lacinia mobilis 3-toothed; 2 plumose setae; processus molaris represented by a single long plumose seta. Left mandible (Fig. 2E) : par incisiva 3-toothed; lacinia mobilis 3-toothed; a plumose seta; processus molaris represented by a single long plumose seta. Maxillula (Fig. 2F) : inner lobe slender, with 2 plumose setae on the distal margin; outer lobe with 10 teeth on the distal margin. Maxilliped (Fig. 2G) ; endite pointed, palp with an entire suture and 3 imperfect segments.

Pereopod 1 (Fig 2H) : basis 2.6 times as long as wide, with 2 setae on inner margin ; ischium 2/3 as long as basis, with 3-5 setae on inner margin and a seta on outer margin ; merus as long as ischium, with 7-8 setae on inner margin and a seta at outer distal angle; carpus as long as merus, with 5 setae and a group of hair on inner margin and a bifid seta at outer distal area; propodus 1.5 times longer than carpus, with 4 setae on inner margin, 5 setae on outer margin and a group of hair on outer distal area; dactylus relatively long.

Pereopod 2 (Fig. 2I) : basis 2.6 times as long as wide, with 5 setae on inner margin and 3-5 setae on outer margin; ischium $2/3$ as long as basis, with 2 setae on both margins; merus as long as ischium, with 5 setae on inner margin and a seta at outer distal angle ;carpus a little shorter than merus, with 5-6 setae on inner margin and 3-4 setae on outer margin; propodus as long as carpus, with 4-5 setae on inner margin, 3-5 setae on basal half of outer margin and many hair on distal half of outer margin.

Pereopod 3 (Fig. 2J) : basis 2.9 times as long as wide; ischium half the length of basis, with 4 setae on inner margin and a seta on outer margin; merus as long as ischium, with 7 setae on inner margin and a seta at outer distal angle; carpus as long as merus, with 6-7 setae on inner margin and 4-6 setae at outer distal angle ; propodus a little

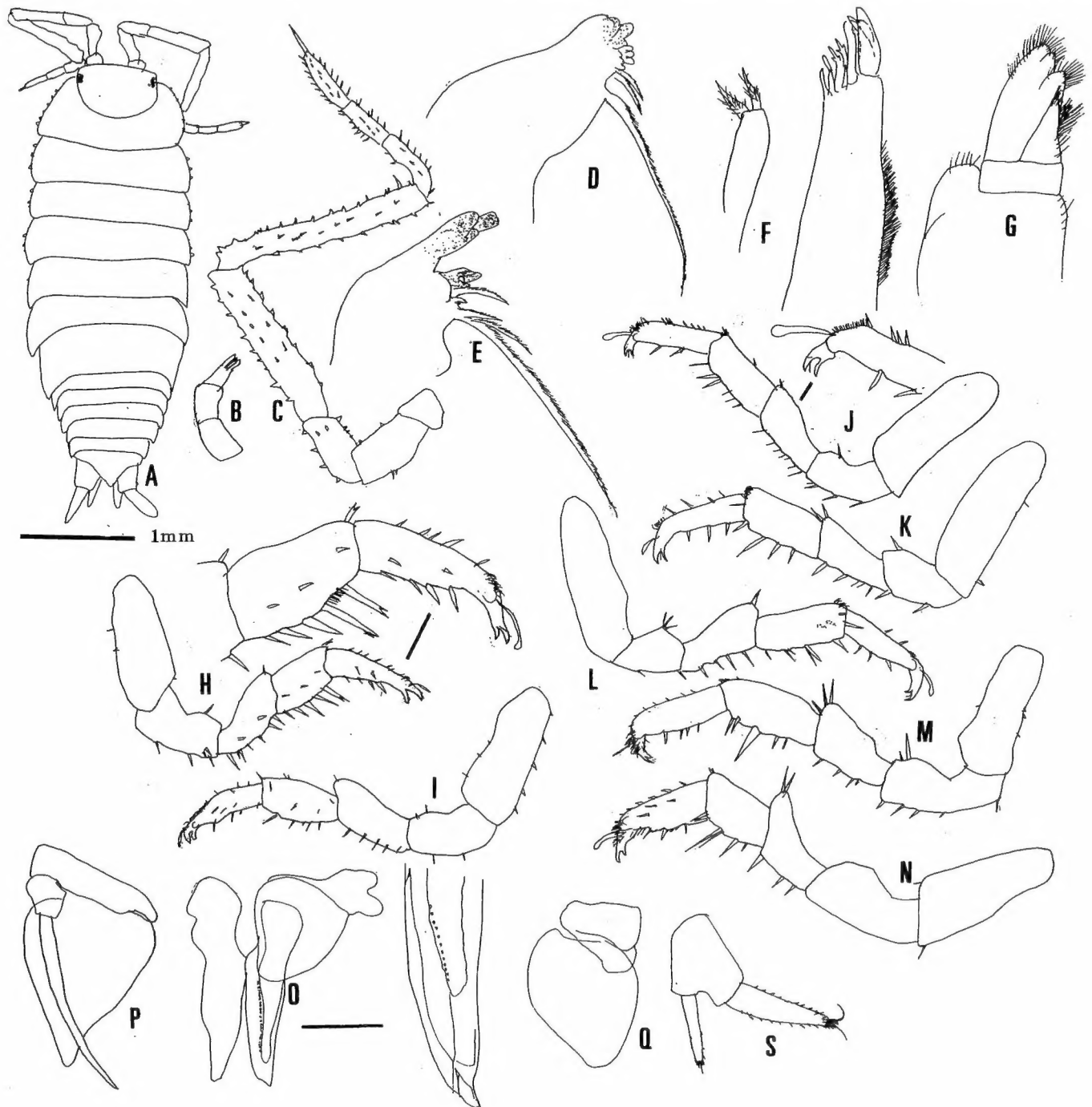


Fig. 2 *Quelpartoniscus setoensis* n. sp.

A: Dorsal view. B: Antennula. C: Antenna. D: Right mandible. E: Left mandible. F: Maxillula. G: Maxilliped. H-N: Pereopods 1-7. O: Penes and Pleopod 1. P: Pleopod 2. Q: Pleopod 3. S: Uropod (All: Holotype male).

longer than carpus, with 2-3 setae on inner margin, 8-9 setae on outer margin and a group of hair of distal outer area.

Pereopod 4 (Fig. 2K) : basis 2.9 times as long as wide; ischium less than half the length of basis, merus a little longer than ischium, with 5 setae on inner margin and 2 setae at outer distal angle; carpus a little longer than merus, with 4 setae on inner margin and a group of hair at outer distal angle; propodus as long as carpus, with 3 setae on inner margin and 4 setae on outer margin and a group of setae at outer distal area.

Pereopod 5 (Fig. 2L) : basis 3.1 times as long as wide; ischium $2/5$ as long as basis, with 2 setae on inner margin and 3 setae on outer margin; merus a little longer than ischium, with 4-5 setae on inner margin and a seta at outer distal angle; carpus 1.2 times longer than merus, with 6-7 setae on inner margin and a group of short setae on outer distal area; propodus as long as carpus, with 3 setae on inner margin, 2 setae on outer margin and a small amount of hair on outer distal angle.

Pereopod 6 (Fig. 2M) : basis 2.4 times as long as wide; ischium $4/5$ as long as basis, with 5 setae on inner margin and 2 setae on outer margin; merus 0.7 times as long as ischium, with 4 setae on inner margin and 3 setae on outer distal area; carpus 1.2 times longer than merus, with 5 setae including a big one on inner margin; propodus a little longer than carpus, with 4 setae on inner margin and 7-10 short setae on outer margin; dactylus with many setae on outer margin.

Pereopod 7 (Fig. 2N) : basis 2.3 times as long as wide, with a inner distal angle; ischium $3/4$ as long as basis; merus $3/5$ as long as ischium, with 3 setae on inner margin and 2 setae at outer distal angle; carpus as long as merus, with 6-7 setae on inner margin and 2-3 short setae at outer distal angle; propodus 1.2 times longer than carpus, with 6-8 setae on inner margin and 7-10 setae on outer margin.

Pleopod 1 (Fig. 2O) : endopod straight, with a series of more than 30 denticles along inner marginal exopod rounded. Pleopod 2 (Fig. 2P) : endopod $1/4$ longer than exopod, and tapering towards the tip; exopod triangular, with 5 denticles on outer margin. Pleopod 3 (Fig. 2Q) : endopod round. Uropod (Fig. 2S) : basis trapezoid; endopod narrow, as long as basis, with a tuft of short setae at the tip; exopod 1.4 times longer and 2.5 times wider than endopod, with a tuft of setae at the tip.

Female: Roughly similar to male except for copulatory apparatus.

Etymology: Seto is the name of type locality.

Remarks: The present new species is most closely allied to *Q. nipponensis* (Nunomura), recorded from Misaki, Osaka Prefecture, but the former is separated from the latter in the following features: (1) narrower body, especially of pereonal somites, (2) pointed pleotelson, (3) presence of a series of denticles on endopod of male pleopod 1, (4) shape of teeth of maxillula, (5) longer processus molaris of mandible, (6) shape of cephalon and (7) shape of antennule.

Material examined: 1♂ (holotype, 3.5mm in body length) and 10♀ (1♀ allotype, 3.4mm in body length and 9♀ paratypes, 1.9-2.5mm in body length) from the pebble shore near high tide mark of Bansho-Zaki, Shirahama-cho, Wakayama Pref. Oct. 4, 2001. coll Noboru Nunomura. Type series is deposited as follows: holotype (TOYA Cr-12933), allotype (TOYA Cr-12934) and paratypes (TOYA Cr-12935-12937) at the Toyama Science Museum, 2 paratypes (OMNH Ar-5879~5880) at the Osaka Museum of Natural History, 2 paratypes (NAMT Cr-15160) at the National Science Museum, Tokyo and 3 paratypes (SMBL Type 411) at the museum of the Seto Marine Biological Laboratory.

Burmoniscus tanabensis n.sp.

(Fig. 3)

Description: Body 2.4 times as long as wide. Color brown with many paler irregular patterns. Cephalon round. Eyes rather small, each eye with 14 ommatidia (Fig. 3B). Body surface smooth, with long setae sparsely. Pleotelson triangular.

Positions of noduli lateralis is as follows:

	d/c	b/c
1	0.08	0.76
2	0.56	0.66

3	0.05	0.56
4	0.35	0.49
5	0.08	0.53
6	0.06	0.38
7	0.10	0.68

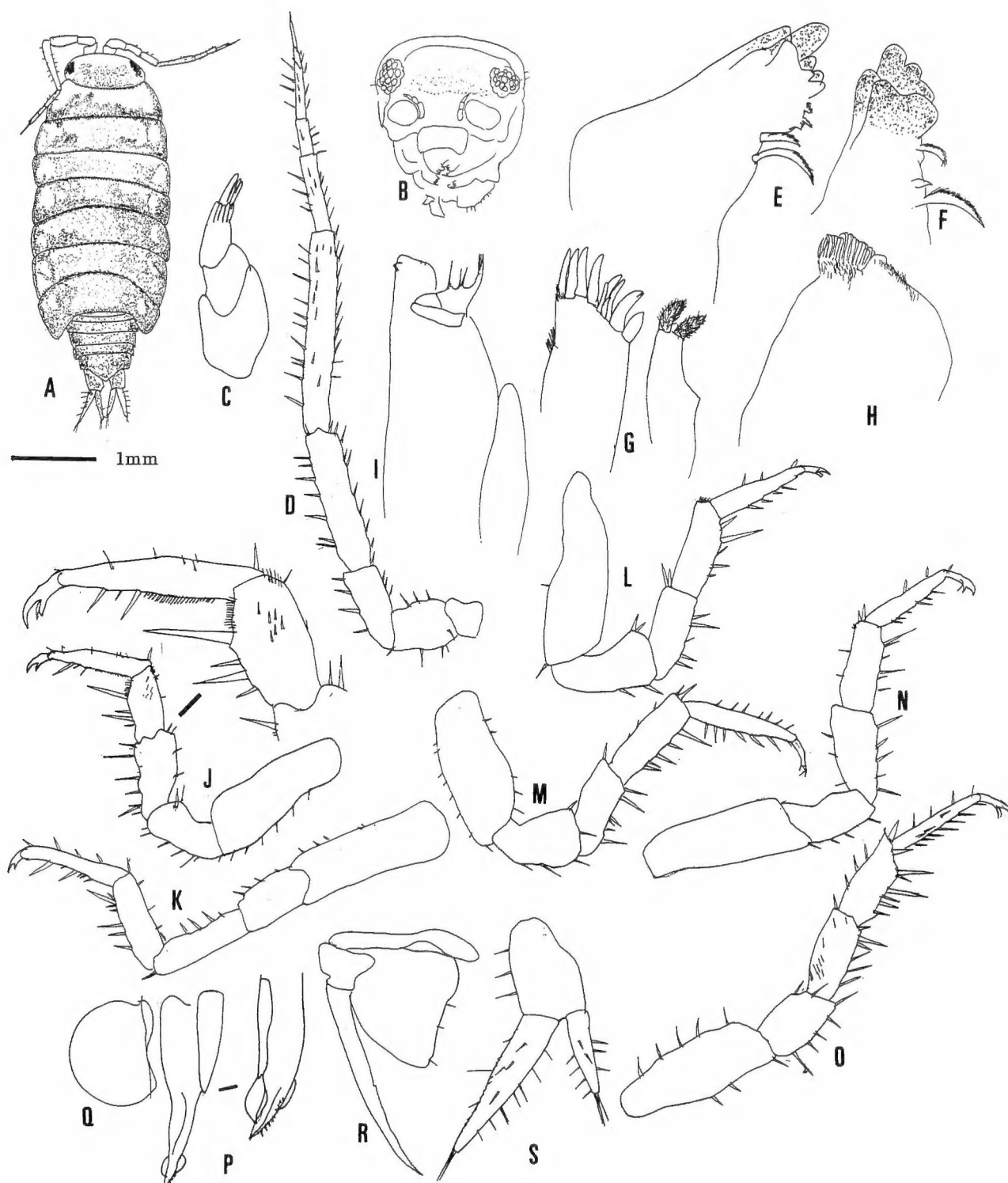


Fig. 3 *Burmoniscus tanabensis* n. sp.

A: Dorsal view. B: Frontal view of cephalon. C: Antennula. D: Antenna. E: Right mandible. F: Left mandible. G: Maxillula. H: Maxilla. I: Maxilliped. J-N: Pereopods 1-5. O: Pereopod 7. P: Penes and endopod of Pleopod 1. Q: Exopod of pleopod 1. R: Pleopod 2. S: Uropod (All: Holotype male).

Antennule (Fig. 3C) : terminal segment with 9 setae at the tip. Antenna (Fig. 3D) reaches the posterior part of 2nd pereonal somite. Right mandible (Fig. 3E) : pars incisiva 4-toothed; lacinia mobilis 3-toothed; a plumose seta; processus molaris represented by a single plumose seta. Left mandible (Fig. 3F) : pars incisiva 4-toothed; lacinia mobilis 2~3-toothed; a plumose seta; processus molaris represented by a single plumose seta. Maxillula (Fig. 3G) : inner lobe with 2 plumose setae on distal margin ; outer margin with 10 teeth on distal margin. Maxilla (Fig. 3H) wide. Maxilliped (Fig. 3I) rectangular, with a spur; palp short.

Pereopod 1 (Fig. 3J) : basis 2.6 times as long as wide, with 7 setae on inner margin; ischium half the length of basis, with 6 setae on inner margin and 2 setae on outer margin; merus as long as ischium, with 6-7 setae on inner margin and 5 setae on outer margin; carpus 4/5 as long as merus, with 4 long setae on inner margin, many fine setae on inner distal area, and 7-8 setae on outer distal area; propodus 1.3 times longer than carpus, with more than 30 setae on basal half of inner margin and 3 relatively long setae on distal half of inner margin, and 5-6 setae on outer margin.

Pereopod 2 (Fig. 3K) : basis 2.9 times as long as wide, with 5-6 setae on outer margin; ischium half the length of basis, with 4 setae on outer margin; merus 1.3 times longer than ischium, with 4 setae on outer margin and a seta on inner distal angle; carpus a little shorter than merus, with 7-8 setae on inner margin and 4 setae on outer margin; propodus 1.2 times longer than carpus, with 6-7 setae on inner margin and 4 setae on outer margin.

Pereopod 3 (Fig. 3L) : basis 3.2 times as long as wide, with a seta on inner distal angle; ischium half the length of basis, with 2 setae on inner margin and 2 setae at outer distal angle ; merus a little shorter than ischium, with 5-6 setae on inner margin and 2 setae at outer distal angle; carpus 1.2 times longer than merus, with 5 setae on inner margin and a group of short setae at outer distal angle; propodus as long as wide, with 4 setae on inner margin and 3 setae on outer margin.

Pereopod 4 (Fig. 3M) : basis 2.5 times as long as wide, with 7 setae on inner margin and 5 setae on outer margin ; ischium 0.6 times as long as basis, with 3 setae on inner margin and a seta at outer distal angle; merus as long as ischium, with 6 setae on inner margin and a seta at outer distal angle; carpus 1.2 times longer than merus, with 5 setae on inner margin and 5 setae on outer margin; propodus 1.2 times longer than carpus, with 6 setae on inner margin and 7 setae on outer margin.

Pereopod 5 (Fig. 3N) : basis 3.1 times as long as wide, with a setae at inner distal angle; ischium half the length of basis, with 3 setae on inner margin; merus 1.4 times longer than ischium, with 5 setae on inner margin and 3 setae on outer margin; carpus as long as merus, with 6 setae on inner margin, 2 setae on outer margin and 2 setae at outer distal angle; propodus as long as carpus, with 6 setae on inner margin and 3 setae on outer margin.

Pereopod 6: basis 2.2 times as long as wide, with 9-10 setae on inner margin, and 3-4 setae on outer margin; ischium 0.7 times as long as wide, with 3-4 setae on inner margin and 2 setae on sternal margin ; merus a little shorter than ischium, with 7-8 setae on inner margin and a seta at outer distal angle; carpus 1.2 times longer than merus, with 9-10 setae on inner margin and 5-6 setae on outer margin; propodus a little longer than carpus, with 6 setae on inner margin and 8 setae on outer margin.

Pereopod 7 (Fig. 3O) : basis 2.8 times as long as wide, with 3 setae on inner margin and 5-6 setae on outer margin ; ischium half the length of basis, with 4-5 setae on inner margin and 3 setae on distal margin; merus 1.2 times longer than ischium, with 6 setae on inner margin; carpus as long as merus, with 6 setae on inner margin, 4-5 setae on outer margin and 2 setae on distal margin; propodus a little longer than carpus, with 6 setae on inner margin and 4 setae on outer margin.

Penes (Fig. 3P) narrow. Pleopod 1 (Fig. 3P) endopod straight with more than 10 denticles and 2 lappet-like structures on distal area; exopod(Fig.3Q) semicircular.

Pleopod 2 (Fig. 3R) almost straight and tapering to towards the tip; exopod triangular.

Uropod (Fig. 3S) : basis rectangular, with 3 setae on lateral margin; endopod relatively short, with 3 setae at the tip; exopod times longer than endopod, with 7-8 setae on inner margin, 2 long and many short setae on outer margin.

Female: Roughly similar to male except for copulatory apparatus.

Etymology: The species name is after the city name of the type locality.

Remarks: The present new species is separable from *Burmoniscus watanabei* (Nunomura, 1986) in the following features: (1) semi-circular exopod of male pleopod 1, (2) simple setae on carpus of pereopod 1, (3) numerous aesthetascs on antennule, (4) simple teeth on outer lobe of maxillula, (5) small eyes and less numerous ommatidia, (6) longer denticles at the tip of endopod of male pleopod 1.

The present new species is separable from *Burmoniscus okinawaensis* (Nunomura, 1986) in the following features: (1) lack of bifurcated setae on carpus of pereopod 1, (2) numerous aesthetascs on antennule, (3) simple teeth on outer lobe of maxillula, (4) small eyes and less numerous ommatidia and (5) longer but less numerous denticles at the tip of endopod of male pleopod 1.

Material examined: 14♂♂ (1♂ holotype, 3.8mm in body length and 13♂♂ paratypes, 2.7-4.0mm in body length and 21♀♀ (1♀ allotype, 5.5mm in body length and 20♀♀ paratypes, 2.6-4.9 mm in body length) Kashima, Tanabe City, Wakayama Pref. Oct. 2, 2001, coll. Noboru Nunomura. Type series is deposited as follows: holotype (TOYA Cr-12949), allotype (TOYA Cr-12950) and 5 paratypes (TOYA Cr-12951~12955) at the Toyama Science Museum, 8 paratypes (OMNH Ar-5881~5888) at the Osaka Museum of Natural History, 8 paratypes (NSMH Cr-15161) at the National Science Museum, Tokyo, and 8 paratypes (SMBL Type-412) at the museum of the Seto Marine Biological Laboratory.

Family Trachelipidae

Lucasioides minakatai n.sp.

(Fig.4)

Description: Body 2.1 times as long as wide. Color brown with a pair of darker patterns on pereonal somite. Dorsal surface smooth. Cephalon with a triangular medial projection from a dorsal view but a low flat on anterior view and a pair of truncated lateral margin. Noduli lateralis on pereonal somites 2 situated from relatively remote from the lateral border, those of pereonal somites 3 and 4 invisible.

Position of noduli lateralis is as follows:

	d/c	b/c
1	0.15	0.75
2	0.33	0.54
3	—	—
4	—	—
5	0.11	0.56
6	0.13	0.36
7	0.12	0.24

Pleotelson triangular with any obvious concavity on both lateral margins.

Antennule (Fig. 4C) short and 3 segments are sub equal in length; terminal segment with 5 aesthetascs at the tip. Antenna (Fig. 4D) reaches the anterior half of pereonal somite 2. Mutual length of 5 peduncular segments is 2:2:3:5:7.5. Flagellum as long as the peduncular segment 5 and mutual length of 2 flagellar segments is 2:5.

Right mandible (Fig. 4E); pars incisiva 4-toothed; lacinia mobilis weakly bilobed; 3 short hairy setae; processus molaris represented by a plumose seta. Left mandible (Fig. 4F): pars incisiva 4-toothed; lacinia mobilis 3-toothed; 3 short hairy setae; processus molaris represented by a plumose seta. Maxillula (Fig. 4G): outer lobe with 10 simple teeth on distal margin. Maxilla (Fig. 4H) rather wide. Maxilliped (Fig. 4I): endite rectangular with a bigger and 2 smaller setae on distal margin; palp slender.

Pereopod 1 (Fig. 4J): basis 3.6 times as long as wide, with 10-11 setae on inner margin; ischium less than half the length of basis, with 6-7 setae on inner margin; merus a little shorter than ischium, with 16-20 setae on inner margin and a relatively long seta at outer distal angle; carpus a little longer than merus, with 18-22 setae on inner margin; propodus almost as long as carpus, with 2 longer setae on distal half and 14-15 small denticles on basal half of inner margin.

Pereopod 2 (Fig.4K): basis 4.1 times as long as wide, with 4-8 setae on both margins; ischium less than half the length of basis, with 2-5 setae on both margins; merus as long as ischium, with 8 setae on inner margin and 2 setae at outer distal angle; carpus a little longer than merus, with 12-13 setae on inner margin and 9-10 setae on outer margin; propodus 0.7 times as long as carpus, with 6-9 setae on inner margin and 10 setae outer margin.

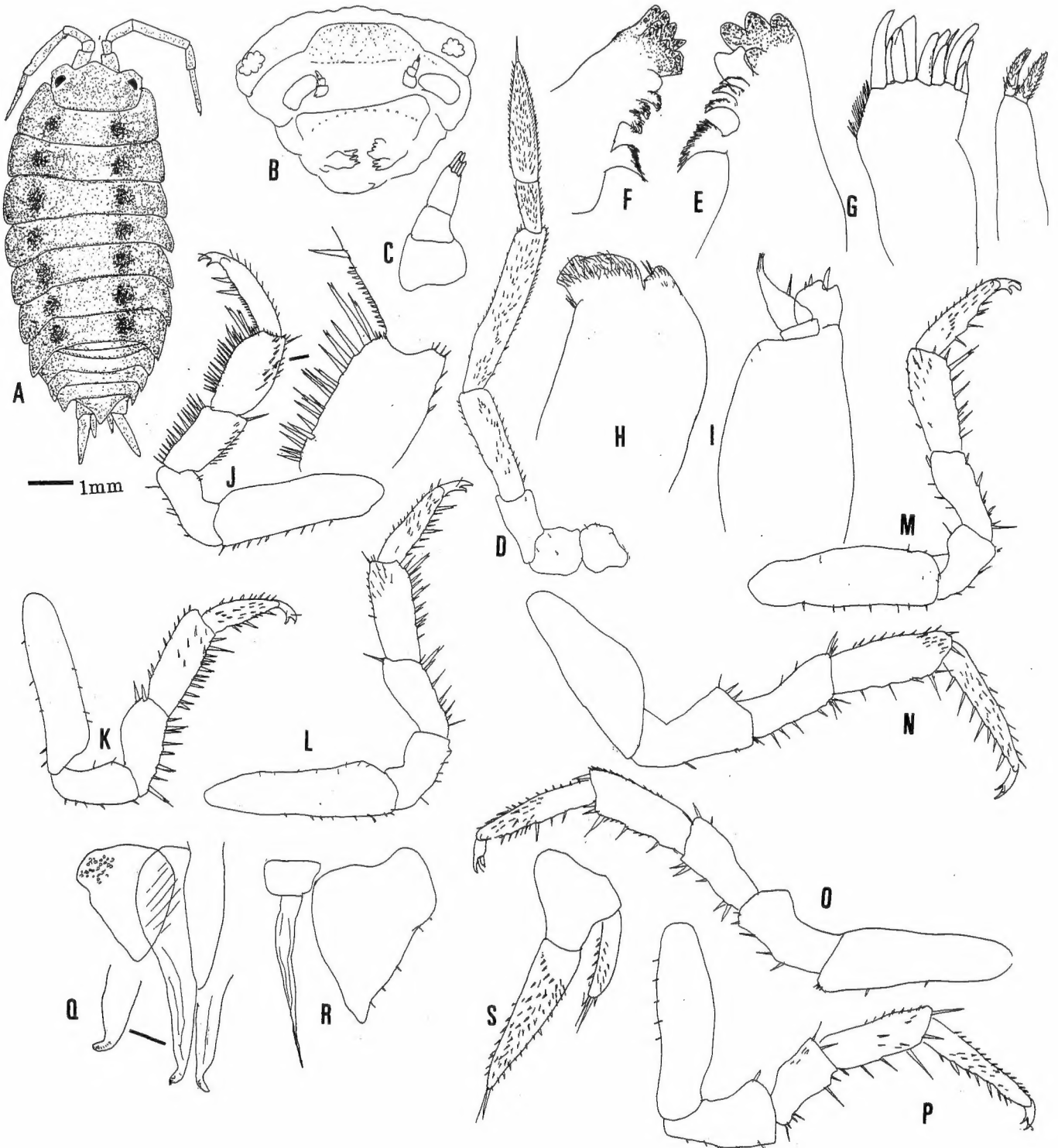


Fig. 4 *Lucasioides minakatai* n.sp.

A: Dorsal vew. B: Fronatl view of cepahlon. C: Antennula. D: Antenna. E: Right mandible. F: Left mandible. G: Maxillula. H: Maxilla I: Maxilliped. J-P: Pereopods 1-7. Q: Penes and Pleopod1. R: Pleopod 2. S: Uropod (All: Holotype male).

Pereopod 3 (Fig.4L): basis 3.8 times as long as wide; ischium $\frac{2}{5}$ as long as basis; merus a little longer than ischium, with 9-10 setae and a long bifid setae on inner margin and a seta at outer distal angle; carpus 1.2 times longer than merus, with 11-13 setae including 2 long bifid ones on inner margin; propodus $\frac{4}{5}$ as long as carpus, with 9-12 setae including 2 long bifid ones on inner margin and 11-14 setae on outer margin.

Pereopod 4 (Fig. 4M): basis; 3.3 times as long as wide, with 7-8 setae on inner margin and 2-3 setae on outer margin 3 ; ischium 0.4 times as long as basis, with 4-6 setae on inner margin and a seta on outer margin; merus 1.2 times longer than ischium, with 7-8 setae on inner margin and 4 setae on outer margin; carpus 1.2 times longer than merus, with 9-12 setae on inner margin and many setae on lateral area; propodus a little shorter than carpus, with 5 setae on inner margin, 9-10 setae on outer margin and many setae on lateral margins.

Pereopod 5 (Fig. 4N): basis 2.7 times as long as wide; ischium $\frac{2}{3}$ as long as basis, with 5-6 setae on inner margin and 3-4 setae on outer distal area ; merus $\frac{3}{4}$ as long as ischium, with 7-8 setae on inner margin, 2-3 setae on outer margin and 3-4 setae at outer distal angle ;carpus 1.3 times longer than merus, with 5-6 setae on inner margin and 10 setae on outer margin; propodus as long as carpus, with 7 setae on inner margin and 7-8 setae on outer margin.

Pereopod 6 (Fig. 4O): basis 3.5 times as long as wide, with 2 setae on inner margin and 3-5 short setae on inner distal area; ischium half the length of basis, with 5 setae on inner margin; merus a little shorter than ischium, with 5-6 setae on inner margin and 2-3 setae on outer distal area; carpus 1.2 times longer than merus, with 5-6; longer and many shorter setae on inner margin; propodus 1.2 times longer than carpus, with 9-10 setae on inner margin and 15-17 setae on outer margin.

Pereopod 7 (Fig. 4P): basis 3.4 times as long as wide; ischium 55% as long as basis, with 5-6 setae on inner margin and a seta on outer margin; merus 0.7 times as long as ischium, with 6-7 setae on inner margin and 2 setae on outer margin; carpus 1.5 times longer than merus, with 4 long setae on inner margin, 2 long setae on distal margin and 7-10 short setae on outer margin; propodus 1.2 times longer than carpus, with 8 setae on inner margin and 4-5 setae on outer margin.

Penes (Fig. 4Q) fusiform. Pleopod 1 (Fig. 4Q); endopod straight, with a series of denticles along inner margin, exopod lanceolate, with a very shallow concavity near the outer distal area. Pleopod 2 (Fig. 4R): endopod straight and tapering towards the tip; exopod triangular, with 5 denticles on outer margin.

Uropod (Fig. 4S): basis broad, endopod a little shorter than basis, with 4-5 setae at the tip; exopod 2.0 times longer than endopod.

Female: Roughly similar to male for copulatory apparatus.

Etymology: The species name is dedicated to the great scholar, late Mr. Kumagusu Minakata, who carried out his great endeavor to conserve the Kashima Islet.

Ecology: The male specimen was found from the litter near the top; female specimens were found both the shore forest and top. The dominant vegetations is composed of *Ilex integra*, *Rhus silvestris*, *Casimelia japonica*, *Machilus thunbergii*, *Daphniphyllum teijssmannii*, *Cinnampom japoniovcius*, *Prunus zippeliana* and many evergreen trees.

Remarks: The present new species is also allied to *Lucasioides nishimurai* (Nunomura), from the main land of Shirahama, but it is separated from the latter in the following features: (1) lack of distinct concavity on the exopod of male pleopod 1, (2) stouter exopod of male pleopod 2, (3) position of noduli lateralis and (4) numerous aesthetascs of antennules.

Material examined: 1 ♂ (holotype, 8.2mm in length) and 6 ♀ ♀ (1 ♀ allotype, 8.0mm in length and 5 ♀ ♀ paratypes 2.5-7.7mm in length), Oyama, Kashima Islet, Tanabe City, Wakayama Pref. Oct. 2, 2001. coll. Noboru Nunomura.

Type series is deposited as follows: holotype (TOYA Cr-12983), alltype (TOYA Cr-12984) and 2 paratypes (TOYA Cr- 12940-12941) at the Toyama Science, a paratype (OMNH Ar- 5889) at the Osaka Museum of Natural History a patatye (NAMT Cr-15162) at the National Science Museum Tokyo and a paratye (SMBL Type-413) at the museum of the Seto Marie Biological Laboratory.

Family Armadillidae

Venezillo longispinus n.sp.

(Fig.5)

Description: Body 2.2 times as long as wide. Color blackish, with many paler irregular patterns. Cephalon with straight anterior border straight. Eyes mediocre in size, each eye with 15-16 ommatidia. Schisma of pereonal somite 1

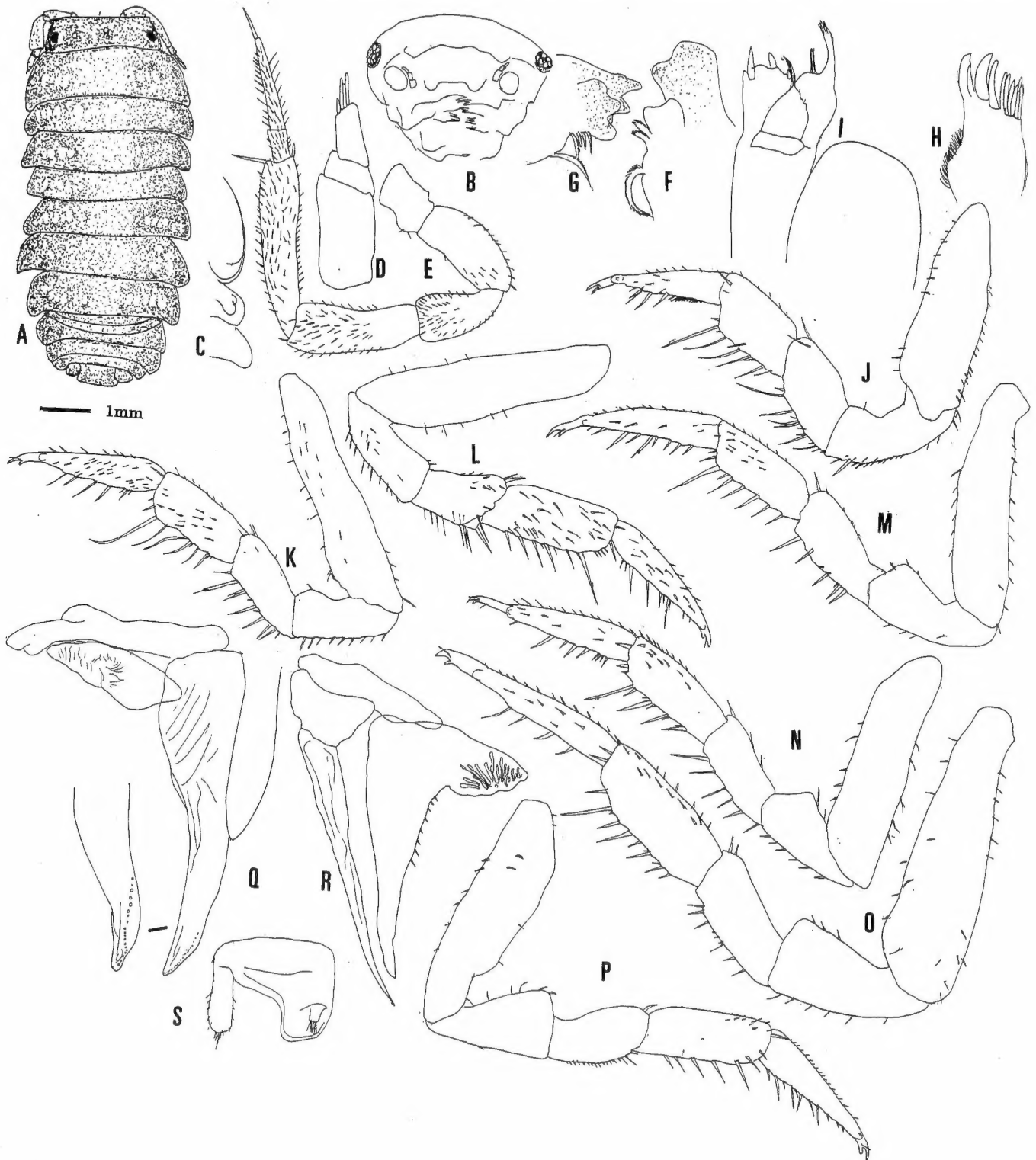


Fig. 5 *Venezillo longispinus* n.sp.

A: Dorsal view. B: Frontal view of cephalon. C: Antennula. D: Antenna. E: Right mandible. F: Left mandible. G: Maxillula. H: Maxilla I: Maxilliped. J-P: Pereopods 1-7. Q: Penes and Pleopod 1. R: Pleopod 2. S: Uropod. (All: Holotype male).

with deep groove, Tooth of pereopod 2 strong. Pleotelson hour-grass-shaped.

Antennule (Fig. 5D): segment rectangular; segment 2 short; segment 3 with 4 aesthetascs at the tip. Antenna (Fig. 5E) reaches the middle area of pereonal somite 1 mutual length of 5 peduncular segment. Flagellum a little shorter than the 5th peduncular segment; mutual length of 2 flagellar segments is 1 : 3. Right mandible (Fig. 5F): pars incisiva 2-headed; lacinia mobilis not chitinized and weakly 2-headed; 2 plumose setae; processus molaris represented by a single plumose seta. Left mandible (Fig. 5G) pars incisiva weakly 3-headed; lacinia mobilis 3-headed; 4 plumose setae; processus molaris represented by a single plumose seta. Maxillula (Fig. 5H): outer lobe with 10 relatively long simple setae. Maxilla normal. Maxilliped (Fig. 5I): endite rectangular, with 3 stout setae; distal angle of palp slender.

Pereopod 1 (Fig. 5J): basis 3.2 times as long as wide, with 15-17 setae on inner margin and 11-12 setae on outer margin; ischium 0.6 times as long as basis, with 18-25 setae on inner margin; merus $2/3$ as long as wide, with 6 longer and 7-10 shorter setae on inner margin and a long seta at outer distal angle; carpus as long as merus, with 5 longer and 5-6 shorter setae on inner margin; propodus 1.1 times longer than carpus, with many fine setae on basal half of inner margin and 4-7 setae on distal half of inner margin and 6-7 setae on outer margin.

Pereopod 2 (Fig. 5K): basis 4.6 times as long as wide, with 4-5 setae on inner margin and 11-12 setae on outer margin; ischium 0.4 times as long as basis, with 9-10 setae on inner margin and a seta on outer margin; merus as long as ischium, with 8 longer and 3-4 shorter setae on inner margin; carpus a little longer than merus, with 6 longer and several shorter setae on inner margin; propodus 1.1 times longer than carpus, with 7 setae on inner margin and 7-10 setae on outer margin.

Pereopod 3 (Fig. 5L): basis 4.2 times as long as wide, 4 setae on inner margin and 5-6 setae on outer margin; ischium 0.4 times as long as basis, with 10-12 setae on inner margin and 2 setae at outer distal angle; merus $2/3$ as long as ischium, with 9-10 setae on inner margin and 2 setae at outer distal angle; carpus 1.6 times longer than merus, with 7-8 longer and several shorter setae on inner margin; propodus a little longer than carpus, with 10 setae on inner margin and 6-10 setae on outer margin.

Pereopod 4 (Fig. 5M): basis 4.2 times as long as wide, with 10-12 setae on inner margin and 6 setae on outer margin; ischium 0.55 times as long as basis, with 3-4 setae on inner margin and 2-3 setae on outer margin; merus $3/4$ as long as ischium, with 5 longer and some shorter setae on inner margin and 5-6 setae on outer margin; carpus 1.2 times longer than merus, with 8-10 setae on inner margin and 8-9 setae on outer margin; propodus 1.1 times longer than carpus, with 8-10 setae on inner margin and 10-11 setae on outer margin.

Pereopod 5 (Fig. 5N): basis 4.0 times as long as wide, with 5 setae on both margins; ischium half the length of basis, with 6 setae on inner margin and 2 setae on outer margin; merus $2/3$ as long as ischium, with 6 setae on inner margin and 3 setae on outer margin; carpus 1.4 times longer than merus, with 4 longer and several shorter setae on inner margin and more than 12 setae on outer margin, 2-3 setae on distal margin; propodus 1.1 times longer than carpus, with 9 setae on inner margin and 12 setae on outer margin.

Pereopod 6 (Fig. 5O) longer than the preceding 5 pairs: basis 3.8 times as long as wide, with 10 setae on inner margin and 6 setae on outer margin; ischium half the length of basis, with 6 setae on inner margin and 3 setae on outer margin; merus $3/4$ as long as ischium, with 9-10 setae on inner margin and 2 setae on outer distal angle; carpus 1.3 times longer than merus, with 8 longer and some shorter setae on inner margin, 2-3 setae on distal margin and 8-9 setae on outer margin; propodus as long as carpus, with 4 setae on inner margin and 12 setae on outer margin.

Pereopod 7 (Fig. 5P): basis 3.7 times as long as wide, with 6 setae on inner margin and 2 setae on outer margin; ischium half the length of basis, with 6 setae on outer margin; merus $4/5$ as long as ischium, with many setae on inner margin and a seta at outer distal margin; carpus 1.3 times longer than merus, with 7-8 long setae on inner margin, 2 setae on distal margin; propodus as long as carpus, with 11 setae on inner margin and 17-18 setae on outer margin.

Penes (Fig. 5Q) slender. Pleopod 1 (Fig. 5Q): endopod straight, with more than 19 denticles on distal area; exopod short and triangular, 0.3 times as long as wide. Pleopod 2 (Fig. 5R): endopod straight 1 exopod long, with a right angled concavity on outer margin, with 8 setae on outer margin. Uropod as in Fig. 5S.

Female: Roughly same to male except for copulatory apparatus.

Etymology: *longus* = long, *spinosus* = thorny in Latin. This species has long setae.

Remarks: The present new species is most closely allied to *Venezillo dorsalis* (Iwamoto), but the former is separated from the latter in the following features: (1) presence of long setae on carpus of pereopods, (2) numerous denticles on the apical area of pleopod, (3) shorter endopod of male pleopod 2, (4) shorter exopod of the same.

Material examined: 14♂♂ (1♂ holotype, 7.2mm in body length and 13♂♂ paratypes, 3.6-7.1mm in body length and 17♀ (1♀ allotype 8.0mm in body length and 16♀ paratypes, 4.8-7.5 mm in body length), Shore forest, Kashima Islet, Tanabe City, Wakayama, Pref. Oct. 2, 2001. coll. Noboru Nunomura.

Type series is deposited as follows: holotype (TOYA Cr-12942), allotype (TOYA Cr-12943) and 7 paratypes (TOYA Cr-12944-12950) at the Toyama Science Museum, 7 paratypes (OMNH Ar-5890~5896) at the Osaka Museum of Natural History, 7 paratypes (NSMH Cr-15163) at the nation Science Museum, Tokyo, and 7 paratypes (SMBL Type 414) at the museum of the Seto Marine Biological Laboratory.

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